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## 5.0 Future Directions

The Council has not yet had the opportunity to address a number of issues having an impact on the mapping program. The issues on the Council's agenda for 2000 are summarized below. As the Council undertakes consideration of these and other topics, its overriding objectives again will be to promote the accuracy of flood-hazard maps.

### 5.1 Unique Flood Hazards

#### 5.1.1 Debris/Ice Jams

Riverine Flood Insurance Studies (FISs) normally assume that channels and bridge openings are free flowing. This is often not the case. Debris and ice can form dams that cause the river stages upstream to exceed the calculated Base Flood Elevation (BFE). The guidelines for FEMA Study Contractors address these natural phenomena and provide criteria for addressing these problems during the studies. It appears, however, that the guidelines are inconsistently applied.

#### 5.1.2 Unstable Stream Channels

In many areas of the country, particularly the arid regions, erosion of channel banks and channel bottoms, deposition of material in certain areas of the channel, and channel migration pose special problems to property owners, floodplain managers, and design consultants. These problems compound and are in addition to the usual problem of overbank flooding. On these streams floods may cause significant loss of channel banks, deposition of gravel and sandbars, and the movement of streambeds over considerable distances. Buildings, bridges and other structures may be lost due to erosion. Portions of channels or entire channels may become unavailable for the conveyance of future flows due to blockage caused by deposition.

Erosion by rivers and channel migration can alter or create new adjacent flood-prone areas. Streambeds are known to shift even beyond the limits of the mapped floodplain or to abandon their previous paths. The physical processes can result in the need to modify mapped delineations to better represent areas that are vulnerable to future floods. Study criteria are needed to identify areas where this level of movement is likely to occur and to define ways in which to address movement in the study/map production process.

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Conventional hydraulic modeling may not adequately represent the physical processes that actually occur in certain streams. Traditional floodplain mapping does not indicate these hazards. In addition, the floodplain management regulations and mitigation techniques employed on traditional streams may exacerbate stream instability, thereby increasing the risk of flood-related damage. Current studies by FEMA and others of the causes and effects of riverine erosion and stream instability may assist the Council as it considers this issue in 2000.

### **5.1.3 Coastal Erosion**

Coastal erosion is an ongoing problem in many areas of the nation. This process can exacerbate flooding. The rapid growth of population in coastal areas can cause increased risk to people and property unless the distribution and rate of erosion is understood and reflected in flood mapping. Current work by FEMA on coastal erosion may lead to information that would support the Council's deliberations in 2000.

### **5.1.4 Subsidence**

In some areas of the country, particularly along the coasts, the land is subsiding to such an extent that flood waters now inundate lands not previously shown as flood-prone, and lands previously mapped as flood-prone are now subject to even greater flooding depths than are shown on current maps. Criteria need to be developed for predicting the long-term impact of subsidence in such areas. Maps of the flood hazard resulting from subsidence need to be updated on a regular basis to alert landowners, lenders, and regulators.

## **5.2 Public Awareness and Outreach**

The Council will discuss the benefits that may result if FEMA uses more descriptive terminology to express the probability of flood occurrences. More descriptive terminology might enhance public awareness of the probability and severity of potential damages. Terms that will be considered will be those that more accurately define the probability of a flood event.

As an example, use of the term "1%-annual-chance flood" rather than "100-year flood" is not only more accurate, but does not convey a misleading message that once a flood of that magnitude occurs people need not be concerned for another 99 years. Similarly, using "0.2%-annual-chance flood" rather than "500-year flood" will still leave the accurate perception that, even though rare, it is a flood that can occur at any time. In fact, there have been numerous instances in locations throughout the country where floods greater in magnitude than a 1%-annual-chance flood, and even greater than a 0.2%-annual-chance flood, have occurred. Some of these floods have caused significant loss of life and severe property damage. The Council will consider how to make the very real risk of such floods more than an abstract hydrologic concept.

Other terms that will be considered will be those more likely to be understood and accepted by the general public. For example, describing the 1%-annual-chance floodplain as "high risk" or "high hazard" area and the 0.2%-annual-chance floodplain as "moderate risk" or "moderate

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hazard” area may have benefits in enhancing public awareness of the risk associated with buying or building in a flood hazard area. The Council is concerned that any choice of new terminology should properly warn people of the level of danger that is totally unrelated to the probability of flood occurrence that can happen in areas outside of Special Flood Hazard Areas (SFHAs). Deaths and property damage from flooding do occur even in areas beyond the 0.2%-annual-chance floodplains, thereby making the term “moderate hazard” seem inadequate.

### 5.3 Risk-Based Analysis of Flood Hazard Determinations

When the ground adjacent to a structure is 0.1 foot or more above the calculated BFE, that structure is determined to be "out" of the SFHA. Often such determinations are formalized by the issuance of a Letter of Map Amendment (LOMA) or Letter of Map Revision (LOMR), and this is the basis for waiving the requirement for flood insurance. However, the calculations of the BFE, under the best of circumstances, are valid to approximately 1 foot. A method of determining BFEs on graduated levels of certainty would recognize the limitations of the hydrologic and hydraulic analyses. Development of a graduated BFE determination method, based on elevation, should be explored and recommendations made regarding its implementation in areas where its use is appropriate.

### 5.4 Use of GPS to Establish BFEs and Improve Mapping

The Council will monitor a demonstration of applications and efficiencies of Global Positioning System (GPS) technology for the National Flood Insurance Program (NFIP). FEMA will be cooperating with the National Geodetic Survey (NGS) in a pilot project to establish highly accurate local GPS vertical control networks in several areas that frequently flood. Procedures using GPS and local control will be developed to improve the accuracy of floodplain boundaries, base map features, post-flood hazard verification, and map accuracy assessment. NGS and FEMA will obtain assistance from local public agencies in the flood areas during network planning, GPS survey data processing, and publication of the results. A manual will be developed with step-by-step procedures for using GPS to determine accurate orthometric heights to meet the needs for flood-hazard mapping, disaster preparedness, and emergency response.

### 5.5 Unmapped Areas

Many of the nation's flood-prone areas have no published FEMA floodplain delineation. These unmapped flood areas fall into five general categories:

1. **No map.** Floodplains in communities that have not yet been mapped by FEMA or any other agency, whether or not the community participates in the NFIP;
2. **D-Zone map.** Floodplains in communities (participating and non-participating) for which FEMA has issued a map with a D-Zone (area of unknown but possible flood hazard);

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3. **Non-FEMA map.** Floodplains in communities (participating and non-participating) for which there is no FEMA mapping but for which there is mapping from other agencies;
4. **Rescinded FEMA map.** Floodplains in communities (participating and non-participating) for which FEMA previously issued a Flood Hazard Boundary Map (FHBM) that was later rescinded; and
5. **Unmapped gap in floodplain delineation.** Unmapped watercourses or portions of watercourses within communities with other flood-prone areas that have already been mapped or that are adjacent to communities with mapping for these watercourses.

As certain areas of the country experience growth, local governments face development pressure in or near floodplains that have never been mapped. Failing to determine the SFHA can affect many people and waste public and private resources, leading to lack of flood insurance coverage, improper new construction (improper location or improper floodproofing techniques), and poor design of protective flood control structures. Some affected parties include:

1. Property owners who do not buy flood insurance;
2. Lending institutions that do not require proper coverage on their collateral;
3. Government and emergency relief agencies that find their disaster relief funds stretched;
4. Local community planning agencies that experience more difficulty performing their development review, floodplain management, and emergency preparedness functions when flood hazards are improperly identified.

Surveyors, engineers, geologists, and planners who raise the question of possible flood hazards for a particular area have at their disposal a variety of approaches to try to describe the approximate limits of flooding with varying levels of accuracy or consistency in the results.

There are two aspects to be considered in addressing unmapped areas. First, there must be a legal/administrative means and a technical means to assure that the question of possible flood hazards will be raised and addressed. Local governments must have a valid basis for requiring that specific unmapped areas, deemed to face a high probability of flood risk, be the subject of formal floodplain studies. Second, there must be accepted methodologies for mapping those areas where mapping is deemed to be necessary. Local governments and others must have access to mapping procedures that will produce technically defensible results.

During 2000, the Council will consider the concerns discussed above. In addition, the need to develop specific recommendations for determining when unmapped areas need to be mapped and for developing and employing specific techniques for such mapping will be considered. The Council believes that the broad question of addressing unmapped areas should include the more specific question of the lessons that can be learned from flood disasters during which flooding may affect both mapped and unmapped areas. Damaging floods provide an important opportunity to review and, if necessary, to revise previously available FIRMs and to provide map coverage in unmapped areas. Funding should be allocated to review previously mapped areas that experienced flood damage and to map previously unmapped flood-damaged areas for which a presidential disaster declaration is made and for smaller areas without a declaration.